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UNIVERSITY OF ALBERTA

THE PLAY OF PRESCHOOL CHILDREN WITH AUTISM AT HOME

BY

GAYLE RESTALL

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.

DEPARTMENT OF OCCUPATIONAL THERAPY

EDMONTON, ALBERTA

SPRING, 1991

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ABSTRACT

This research focussed on two questions related to the play of children with autism. First, how does the play of autistic children differ from that of normally developing children? Second, what are the relationships between autistic children's play performance and their social, communication, and motor abilities as reported by their parents?

Previous research has suggested that cognitive, social and language abilities influence children's play. In addition, the play of autistic children has often been found to be qualitatively different than the play of normally developing children. The nature and extent of these differences, as they are demonstrated in children's home environments, have not been well defined.

Nine preschool autistic children were matched to normally developing children on the basis of mental age, gender, and parental socioeconomic status. Videotapes of children playing in their homes were rated using the Preschool Play Scale (PPS). Parents were interviewed using the Vineland Adaptive Behavior Scales (VABS). Autistic children's total and dimension scores of the PPS were compared to those of normally developing children. Total play scores were correlated with socialization, communication, and motor domain scores of the VABS.

Results indicated that autistic children differed from their normally developing peers on the total play score and the participation dimension. Communication was the adaptive ability most highly associated with autistic children's play performance.

These findings further our understanding of the nature of autistic children's play. The differences between the play of autistic and normally developing children were evident even in environments familiar to the child. The social and communicative elements of play contributed most to those differences. The results provide support for deficits in social development being a primary feature of the disorder. The practical application of the findings to assessment and treatment programs is discussed.

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CHAPTER I
INTRODUCTION

Play constitutes a considerable proportion of children's time. From her sample of American children, Bloch (1989) estimated that preschool children spend approximately 30% of their waking time in play activities. Thus it is an important activity in their everyday lives. Many theorists believe that play has an important function in children's social, cognitive, and emotional development and consequently it has received considerable attention in the developmental literature. This literature suggests that the play behavior of preschool children is a complex interaction of individual and environmental characteristics.

Although the play of normally developing children is often quite varied, the play of autistic children has been reported to be repetitive and often lacking variety and creativity (Kaplan & Sadock, 1988). Manipulation of toys frequently consists of spinning them or lining them up (Rutter, 1985). Imaginative play is frequently absent and, when present, is often very stereotyped (Wing, Gould, Yeates, & Brierley, 1977). Thus the play of autistic children tends to be distinctly different from the play of normally developing children.

Examining the play of preschool autistic children and the ways in which it differs from the play of normally developing children is an important field of study for several reasons. First, it is fairly well acknowledged that play involves cognitive, language, social, and motor components. Consequently, play is frequently used in the assessment of these abilities. However, the unique contribution of play to the assessment of children is that it involves not only individual abilities but also the integration of those abilities into an activity that has relevance for the child. This is an important issue, not only for making diagnoses and identifying targets for intervention, but also for ensuring that the outcomes of treatment are valid for the child. For example, if treatment aimed at improving a child's motor abilities results in improved skills during treatment in the clinic setting but does not result in improved skills when the child is playing in a natural environment, then the validity of the outcome is open to question.

Second, play is considered to be intrinsically motivated behavior (Rubin, Fein, & Vandenberg, 1983). As such, it may be a stronger indicator of what a child *likes* to do rather than what a child *can* do. Understanding a

child's play may be one way in which to understand the child's motivations and interests in a variety of objects and activities and, if necessary, to expand and develop those interests. For autistic children whose interests can be very restricted, play can be a method of expanding those activities and interests in a way that is pleasurable to the child.

This study compared the observed play of preschool autistic children in their homes to the play of normally developing children who were matched to the autistic children on the basis of gender, mental age/chronological age, and socioeconomic status. The observations were also compared to the results of a parent report measure of communication, social, and motor abilities to determine the relationship between these areas of adaptive functioning and the children's play performance.

The purpose of this study was to increase our understanding of the play of autistic children within the context of the child's home environment and the ways in which their play differs from that of normally developing children. This type of information has theoretical implications for increasing our understanding about the nature of the developmental deficits and deviancies that are associated with autism and how they may influence play behavior. This type of information also has practical implications. Analysis of play behaviors in natural environments can assist in determining areas of developmental delay or deviancy that can be facilitated through treatment programs using play as a therapeutic medium.

CHAPTER II
LITERATURE REVIEW

The literature review will be used to discuss the play behavior of normally developing and autistic children and individual and environmental factors that influence that behavior. First, the nature of play and its importance to children's development will be discussed. Next, the research describing the individual and environmental factors that influence normally developing children's play will be reviewed. Finally, previous research regarding autistic children's play and the differences in play behavior between autistic and normally developing children will be described.

The Nature of Play

Definition of Play

The diverse nature of play has made a precise definition of play difficult. Rubin et al. (1983) outlined various approaches to the definition of play. One approach is to define play in terms of context, that is, to define it as mutually agreed upon behavior that occurs in a particular context for a particular culture. However, for the purposes of gathering data on play, a more precise definition is needed.

The second approach is to define play in terms of certain behaviors such as those that represent the cognitive aspects of behavior. This approach does not take into consideration the child's desire to engage in the activity.

The third approach considers play as being composed of a number of features (Rubin et al., 1983). This is the approach that was used to define play for this study. Three features are used in this definition and are based on those proposed by Rubin et al. (1983). First, the behavior must be "intrinsically motivated." That is, the child must want to engage in the activity. This does not preclude encouragement or prompting of play behavior but rather there must be some maintenance of the play behavior that occurs as the result of the child's own volition. Second, the behavior must be defined by the child's actions on play materials rather than the end product. This feature includes activities in which the child creates something but emphasizes the means by which the final product is created. This feature excludes activities that are done for some self care need such as eating or brushing teeth. Finally, the child must be actively engaged in the activity. This implies that there is some motoric response on the part of the child when engaging in the

activity. Therefore, watching television would not be considered a play activity but playing a video game would be considered such an activity. In summary, play is defined as the child's active engagement in activities that the child has selected and the actions appear to be more important than the outcome.

A Model of Play Development

Although theorists have not agreed on the precise nature of play or its function, there has been considerable evidence to suggest that it has an important role in children's development. Reilly (1974) proposed that the product of play is skill and that play assists children to master developmental tasks. These tasks include the development of habits necessary to assume more complex roles in society (Neville, Kielhofner, & Royeen, 1985).

The model of human occupation (Kielhofner, 1985) illustrates one way to conceptualize the development of play. In this model, behavior is viewed as progressing through the stages of exploration, competency and achievement. Exploration is the active investigation of the environment by an individual and leads to the development of skills. The individual builds on these skills and strives for the development of competency, i.e., behaviors that meet the expectations of the environment. This leads to the further development of skills and the formation of habits for the individual's typical patterns of behavior. Patterns of competent behavior lead to achievement which results in the assumption of a variety of roles. It is through exploration and competency experienced in play that children develop skills and habits that prepare them for adult roles (Kielhofner, 1980).

Play activities also offer children the opportunity to gain a sense of control over their environment (Neville et al., 1985). This control results from children's abilities to make choices about how and with what they play. The choices that are available to children during play are frequently unavailable to them in other aspects of their adult dominated life. Therefore, children are able to explore activities that are pleasing to them and to develop interests in those activities (Kielhofner, 1980).

Normally Developing Children's Play

Studies of children's play have demonstrated that play tends to occur as a function of the child's individual characteristics, the objects with which

they play, and the settings in which the play occurs. This section will discuss literature on the play of normally developing children and what is known about the influences of a variety of individual and environmental factors.

Individual Characteristics

Development. Play behaviors are thought to be strongly related to cognitive, language, and social abilities and very likely influence and are influenced by these abilities (Piaget, 1962; Vygotsky, 1966). Therefore, the child's global developmental level appears to be one of the primary influences on children's play.

Several studies of normally developing children have shown that play tends to progress along a fairly consistent developmental path (Rubin et al., 1983). This path is strongly related to the child's cognitive abilities and consists of the following broadly defined stages. First, the child engages in sensorimotor activity. This consists of repeated actions and manipulations such as banging blocks or mouthing a rattle. Next, the child engages in constructive activity. This includes forming or creating something such as building a tower with blocks or establishing some other type of organization to the objects. This stage represents a change in the child's abilities from manipulating objects to forming relationships between them (Smilansky,1968). Next, the child uses realistic objects in a manner that represents the object's intended use. This includes activities such as picking up a toy telephone and speaking into the receiver. This stage is sometimes referred to as functional play and represents the onset of imaginative play (Rubin et al., 1983). Finally, the child gives objects attributes that they do not realistically have or imitates uses of objects in their absence. This involves actions such as talking into a block as if it were a telephone receiver. This stage is a more complex form of imaginative play.

Progression through this cognitive developmental path of play seems to be closely related to developments in social behavior. Parten's (1932) classic work on social participation showed that interaction with peers increases with age during the preschool years. Subsequent studies have supported this finding and have provided evidence, not only for increasing quantity, but also for increasing complexity of social interaction during these years (Hartup, 1983). This increasing complexity is probably associated with increases in cognitive and language abilities as well as an increase in social

maturity itself. Observations of children in preschool settings have supported a relationship between more cognitively complex and more socially complex levels of play (Rubin, Watson, & Jambor, 1978). Language abilities have also been associated with more socially mature forms of play (Sherrod, Siewert, & Cavallaro, 1984).

The relationship between language abilities and the cognitive maturity of play has also been studied. A number of investigators such as Ungerer and Sigman (1984) have found positive associations between the maturity of language and symbolic play. Such a relationship may result from the development of a symbol system that is expressed in both language and play (McCune-Nicolich, 1981).

In spite of these developmental trends in play behavior, it is important to note that normally developing preschool children frequently engage in "less mature" forms of play even though they are capable of more cognitively complex forms of play. Preschool children's preferences for play materials that are associated with sensorimotor play, the least mature form of cognitive play, over those materials that are associated with other forms of play such as constructive or pretend play have been well documented (Clifford & Bundy, 1989; Loovis, 1985; Wolfgang & Phelps, 1983). However, preschool children also enjoy play materials that are associated with more cognitively mature forms of play. What is important then, is not whether children engage in "immature" forms of play but the additional capacity and desire to also engage in more complex forms of play. This suggests that there is considerable variety in normally developing children's play behavior.

The influence of perceptual and motor development on play has received little attention in the play literature. The ability of children to participate in play activities such as throwing a ball must be linked to their perceptual and motor skills. The preschool years are a time when many new motor skills are achieved and refined (Cratty, 1986). The ability of children to participate in activities that require complex perceptual motor skills increases the variety of play activities in which they can participate.

Gender. Another individual characteristic that appears to influence play behavior is the child's gender. Rubin (1977) found that boys tended to play more with vehicles and blocks whereas girls tended to play more with cutting, pasting and painting materials. This sex-typed preference for play materials

has been substantiated by others (Sutton-Smith, 1986) and may begin to emerge before two years of age (Rubin et al., 1983). Sex-typed preferences for play materials are thought to be strongly influenced by cultural factors (Rubin et al., 1983).

Environmental Factors

Objects. Play materials have important influences on children's play behaviors. Investigators (Rubin, 1977; Pellegrini & Perlmutter, 1989) have observed that preschool children's play with certain materials has tended to fall into certain cognitive play categories even though other types of play were possible. For example, Rubin (1977) observed that 90% of children's play with sand and water in a preschool setting was sensorimotor, even though constructive play was possible with these materials. Investigators (Hendrickson, Strain, Tremblay, & Shores, 1981; Quay, Weaver, & Neel, 1986; Rubin, 1977) have also observed that play materials can change the social interaction of preschool children. Housekeeping toys have been associated with social play and art activities have been associated with more isolated play.

The influence of certain materials on cognitive and social play suggests that the availability of those materials may affect children's play development. The relationship between availability of play materials and development is likely most important before children are independently mobile (Wachs, 1985). Independently mobile children may use any materials regardless of whether or not the materials are culturally defined as toys. Bloch (1989) found that the play patterns of two groups of children did not differ even though one group used materials salvaged from garbage or natural environments and the other used commercially manufactured toys. Both groups found objects to use in their play activities.

Settings. Research has demonstrated that a variety of setting variables may also affect children's play behavior. In preschool or clinic settings, density and location of play space (Rubin et al., 1983) and peer characteristics such as sex (Pellegrini & Perlmutter, 1989) and age (Hartup, 1983) have been shown to influence children's play. In the home environment, Dale (1989) found that family play partners influenced pretend play. Play with siblings included both object centred play and play in the absence of objects. Play

with mothers focussed almost entirely on the use of objects. Dale (1989) proposed that such differences arose because mothers perceived their roles differently than siblings when playing with their child.

Family Socioeconomic Status. Family socioeconomic status may also influence the social and cognitive complexity of children's play (Rubin, 1977; Smilansky, 1968). However, the influence of other ecological variables such as the child's familiarity with the play materials available during the studies has made these findings difficult to substantiate (Rubin et al., 1983).

In summary, play behaviors of normally developing children are influenced by a complex interaction of individual and environmental factors. Therefore, when studying the play of children, individual characteristics such as the level of cognitive, social, language, and motor development as well as the child's gender should be considered. In addition, environmental factors such as family socioeconomic status, play materials, and play partners must be considered and controlled for to some degree.

Autistic Children's Play

Autistic children have three central areas of dysfunction. First, there is a qualitative impairment in the child's ability to partake in social interactions. Second, there is an impairment in the child's ability to communicate and to engage in imaginative activity. Finally, the child's activities and interests are very restricted (American Psychiatric Association, 1987). These areas of impairment manifest themselves in a number of behavioral characteristics that often include abnormalities in play behavior (Kaplan & Sadock, 1988).

In this section, the literature regarding the play of autistic children will also be examined in terms of the individual and environmental factors that have been shown to influence play behavior. Due to the small body of literature about the play of preschool autistic children, relevant studies on the play of school age autistic children will be included.

Individual Characteristics

Development. Autism is a developmental disorder that is characterized by deviancies as well as delays in development. In addition, the disorder is often associated with mental retardation and, less frequently, with some

neurodevelopmental impairment (Rutter, 1985). All of these factors influence the child's general developmental level.

Although autistic children have been described as lacking pretend play (Rutter, 1985), the cognitive deficits of many autistic children may partially account for this absence. To control for the impact of mental age on play, Sigman & Ungerer (1984) matched autistic children, ranging in chronological age from 39 to 74 months, with mentally retarded and normally developing children using an intelligence test and assessed the complexity of their pretend play. The autistic children tended to spend equal amounts of time in manipulation, relational (putting two objects together), and functional (using realistic objects in a manner that reflects their intended use) play. In contrast, both normally developing and mentally retarded children spent more time in functional play than in either manipulation or relational play. Therefore, although the autistic children were capable of the more mature form of play they did not use these abilities in the same proportions as the other two groups of children (Sigman & Ungerer, 1984).

One explanation for these differences is that young autistic children may choose to spend more time playing with objects in a less mature manner even though they are capable of more complex play (Ungerer & Sigman, 1981). Limited participation in cognitively complex forms of play has not been conclusively either supported or refuted by other investigators. DeMyer, Mann, Tilton, and Loew (1967) interviewed mothers of autistic and normally developing children using a yes/no questionnaire and found differences in the maturity of their children's play behavior. However, they had matched normally developing children to the autistic children on the basis of chronological age, not on a cognitive measure so the differences could have been the result of cognitive ability rather factors than other elements of children's play preferences. McHale (1983) noted that the autistic children in her study frequently engaged in gross motor activities, a cognitively immature form of play, but she did not compare this with the choices of the normally developing peers.

Correlations of symbolic play with measures of cognitive functioning such as the Bayley and the Stanford-Binet Scales, have been negligible for autistic children but low to moderate correlations have been found for language disordered and developmentally delayed children (Power & Radcliffe, 1989). This finding has added support for Sigman & Ungerer's

(1984) position that there may be qualitative differences in autistic children's play that result from factors other than cognition.

One factor that could account for some of these qualitative differences in imaginative play is related to the social impairments of autistic children (Wing, 1988). Imaginative play includes social qualities when children assume the roles of other people. In order to assume such roles the child must understand that other people have different perspectives than their own. This ability to attribute different intentions and beliefs to others has been called "theory of mind" (Premack & Woodruff, 1978). Researchers (Baron-Cohen, Leslie, & Frith, 1985) have shown that many autistic children lack the capacity to understand other people's perspectives. Baron-Cohen (1988) has proposed that "theory of mind" is necessary not only for role-taking but also for communication. Deficits in this capacity may partially explain autistic children's difficulties in both communication and imaginative play (Leslie, 1987).

Associations between autistic children's communication and their imaginative play have been demonstrated by several researchers. Mundy, Sigman, Ungerer, and Sherman (1987) found a positive relationship between language development and frequency of symbolic acts during autistic children's play. Gould (1986) found a moderate positive correlation between language comprehension and cognitive level of play. McHale, Simeonsson, Marcus, & Olley (1980) found that frequency of symbolic play was positively correlated with frequency of symbolic communication.

Other Characteristics. Studies of autistic children in various environments have shown that they spend a fairly large percentage of time in play behaviors (Baron-Cohen, 1987; Black, Freeman, & Montgomery, 1975; Lewis & Boucher, 1988; Ungerer & Sigman, 1981). However, autistic children's choices for play materials and play activities may be different in both variety and type from those of normally developing children who have been matched on cognitive measures.

Restrictions in the variety of autistic children's play may result, in part, from some autistic children's unusual attachments to objects (Wing, 1988). Although the severity of the restriction in activities seems to be positively associated with the severity of cognitive impairment (Wing, 1988) it is not well understood what properties of the objects attract the child to certain objects or

activities to the exclusion of other objects. The literature on normally developing children cited earlier suggests that children's preferences for certain toys are often associated with the child's gender and the cultural factors associated with sex-typing of toys and activities. However, it is questionable whether these same factors also influence autistic children's toy preferences.

Dewey, Lord and Magill (1988) found that the autistic children in their study rated preferences for toys differently than normally developing and behavior disordered children. The autistic children demonstrated a greater preference for games and constructive activities and a lesser preference for imaginative activities than the other groups of children. The autistic children's ratings may have been different because their preferences for toys were dependent on factors such as a desire for structure (Dewey et al., 1988).

Autistic children's preferences for play activities may also differ from other groups of children in similar environments. Tilton & Ottinger (1964) found that autistic preschool children combined toys less frequently than mentally retarded and normally developing children of similar chronological ages. In a reanalysis of the same data, Weiner, Ottinger and Tilton (1969) found that combining toys was the most important toy use variable for discriminating autistic children from normally developing and mentally retarded children.

Environmental Factors

Objects. Similar to normally developing children, there is evidence to suggest that play materials affect autistic children's play behaviors. Dewey et al. (1988) studied the effects of play materials on the social interactions of dyads of autistic, normally developing and behavior disordered children. Dyads were presented with materials for sensorimotor play (e.g., sand and shovels), materials for constructive play (e.g., blocks), materials for imaginative play (e.g., doctor's kit), and materials for games. Games were associated with more complex social and nonsocial play and involvement in play than were materials for sensorimotor, constructive, or imaginative play.

Black et al. (1975) observed five hospitalized autistic children, ages four years, six months to six years interacting in four different environments. They found that interaction between the children was more frequent in a confined space with gross motor materials.

Settings. Characteristics of the play setting, such as the people present and the amount of structure available, may also affect autistic children's play behavior. Kasari, Sigman, Mundy and Yirmiya (1988) found that mothers of autistic children used physical means to prompt their children's play more than mothers of mentally handicapped or normally developing children. This may have been an appropriate response to the special needs of their children in order to maintain mutual play. Other studies have found that autistic children's play behavior increases when other people provide modelling and reinforcement (Tryon & Keane, 1986), instruction, guidance, modelling and reinforcement (Meyer et al., 1987) or imitation (Tiegerman & Primavera, 1981). Autistic children's social interaction may increase when playing with older peers. Lord (1984) found that autistic children responded more frequently to same-aged peers than younger ones. This was explained, in part, by the tendency of same-aged peers to initiate interactions more frequently than younger peers. Gould (1986) found that a group of socially impaired children, that included autistic children, demonstrated more complex imaginative play during administration of a standardized play test than during observations in natural environments. This suggests that the cognitive complexity of autistic children's play may be greater in settings that provide more structure.

In summary, autistic children's play, like the play of normally developing children, seems to result from interactions between individual and environmental characteristics. However, autistic children's play appears to be qualitatively different than the play of normally developing children who have been matched for cognitive abilities at least when observed in standardized clinic environments.

Assessment of Play Skills

The literature cited above suggests that autistic children's play is different from the play of other children with the same cognitive ability. Therefore, analysis of autistic children's play is important for understanding the nature of autism. Differences in play behavior are important because the goal of most intervention programs is to approximate normal behavior. While it may be unreasonable to expect that autistic children's play can be normalized, increasing their abilities to play can have a range of general and specific beneficial effects. For example, there is evidence to suggest that play

with toys can facilitate the peer interactions with which autistic children frequently encounter many difficulties (Lord, 1984). Also, specific behavioral deviancies that are demonstrated by many autistic children may be diminished through the use of play activities. For example, self-stimulatory behaviors decrease when children are actively involved in a play activity (Rutter, 1985; Tryon & Keane, 1986).

The importance of studying autistic children's play raises the question of what is the best method of evaluating play so behaviors that are relevant to the child can be identified and compared. When determining the best method of evaluating play, consideration must be given to the comparison group, the environment, and the method of collecting data.

Comparison Group

Autism has such a wide variation in symptoms that an appropriate comparison group is often difficult to identify (Powers, 1988). One method of identifying behaviors for comparison purposes is to use normal standards in the child's environment (Kazdin, 1982). Normal standards can be at least partially identified by the behaviors of the child's peers. The current emphasis on the integration of children with developmental disabilities into regular child care and educational settings means that autistic children's peers are often normally developing children. Therefore, play behaviors of normally developing children who have been matched for individual characteristics that influence play, such as cognition, gender, and socioeconomic status can represent a standard that is relevant to the autistic child.

Environment

Play should be evaluated in the environment in which it most frequently occurs. Although evaluations of play behaviors in standardized clinical settings have relevance for studying a number of theoretical and diagnostic issues related to autism, it has less relevance for treatment purposes. Environmental factors appear to have a significant impact on play performance. Consequently, the identification of targets for clinical intervention should be based on children's behavior in the context of natural environments. Although play has frequently been studied in preschool settings, less research has been done on play in their home environment.

This has occurred despite the observation that children spend the greatest proportion of their play time in and around their home (Bloch, 1989).

Data collection

Three general methods for gathering data on the play of autistic children can be identified in the literature. These are: parent reports, administration of standardized tests, and play observations.

Parent reports consist of structured or semistructured parent interviews that gather information on children's play performance. Such instruments can focus exclusively on child play (e.g., Play History, Takata,1974) or can focus on several components, one of which may include play performance.

Standardized tests evaluate play using standardized procedures. They usually involve assessment of specific aspects of play such as cognitive development. Gould (1986) used the Lowe and Costello Symbolic Play Test to assess the symbolic play development of autistic children. She stated that the test was useful for diagnosing language impairments but was not useful for evaluating the spontaneous or qualitative aspects of play. This raises the issue of whether children's performance on a standardized test is, in fact, play. If the definition of play provided earlier is accepted, then play must be intrinsically motivated. Therefore, spontaneity would seem to be a necessary condition for it to occur.

Observations have been advocated as being the most appropriate method for assessing autistic children's play (Watson & Marcus, 1988). Such assessments can occur in standardized settings with standardized toys (Black et al., 1975; Clune, Paolella, & Foley, 1979; Tilton & Ottinger, 1964) or in natural environments (Gould, 1986).

Observations of autistic children in their homes that have focussed specifically on play rather than on other issues such as parent-child interaction have not been reported in the literature. This study addresses this void by reporting on systematic observations of autistic children's play in their homes as they compare to normally developing children's behaviors.

CHAPTER III
OBJECTIVES AND HYPOTHESES

The primary objectives of this study were to compare the observed play behavior of preschool autistic children with the play of normally developing children and to determine the relationships between children's social, communication, and motor behaviors and play performance. Two research questions and five hypotheses were identified.

Research Question 1

How does the play performance of autistic children, as measured by the Preschool Play Scale (PPS) (Bledsoe & Shepherd, 1982; Knox, 1974) (Appendix A) and numbers of categories of play materials used, differ from the play of normally developing children who have been matched by mental age, gender and socioeconomic status?

Hypothesis 1

Autistic children would have significantly lower PPS total, participation, imitation, and space management scores than normally developing children. These differences were expected for the following reasons.

First, autistic children were expected to score lower than normally developing children on the participation dimension. This dimension includes social and language play. Deficits in social interaction and language abilities of autistic children were expected to cause lower scores on this dimension.

Second, autistic children were expected to score lower than normally developing children on the imitation dimension. This dimension essentially consists of imaginative play. Although autistic children were matched on a cognitive measure, the previously cited literature suggested that they would be less likely to spontaneously participate in this type of play behavior than normally developing children.

Third, autistic children were expected to score lower than normally developing children on the space management dimension which is a measure of gross motor abilities used during play. This difference was expected to arise as the result of neurodevelopmental impairments that occasionally have been observed in autistic children (Rutter, 1985). The presence of a mild to moderate impairment in this area was not controlled because excluding autistic children with this type of impairment may have

decreased the number of appropriate subjects. However, descriptive information was available from the motor skills domain of the VABS to determine if the autistic and normally developing children differed in these skills.

Hypothesis 2

There would be no difference between the mean scores of autistic and normally developing children on the material management dimension. The previously cited literature suggests that autistic children do participate in play activities. Therefore, it was expected that their ability to manipulate objects would be similar to those of the normally developing children as reflected in similar scores on this dimension. Due to the difficulties in testing hypotheses in which scores are not expected to be different, 95 per cent confidence intervals were used.

Hypothesis 3

Autistic children would differ from normally developing children in the number of categories of play materials that they used during the obsevation time.

Hypothesis 4

PPS dimension scores would be significantly correlated.

Research Question 2

What are the associations between the play performance of autistic children and normally developing children and parental reported communication, social, and motor abilities as measured by the Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984)?

Hypothesis 5

Autistic children's PPS total scores would be significantly correlated with VABS total scores and communication, social, and motor domain scores.

CHAPTER IV
METHODS AND PROCEDURES

Sample

The participants for this study were nine autistic children between the ages of three and six years and nine normally developing children. The chronological ages of normally developing children were matched to the mental ages of autistic children to partially control for the influence of cognition on play behavior. Children were also matched for gender and parental socioeconomic status to partially control for the influences of these factors on preschool children's play behavior.

Children with mental ages of less than 18 months or intelligence quotients of less than 30 and those who were severely physically handicapped were excluded from the study. This ensured that all children had sufficient cognitive ability to participate in many forms of play behavior and had sufficient mobility to be able to make choices about their own play experiences. Each child's parent had to be able to speak and understand English in order to complete the questionnaire and interview.

Autistic children were diagnosed according to DSM III-R (American Psychiatric Association, 1987) criteria by a clinical psychologist with expertise in the field of autism and either another psychologist or a psychiatrist. They were recruited through the office of a clinical psychologist. Staff from the office called parents and requested their permission to forward their names to the investigator. Parents who agreed to have their names given to the investigator were contacted by letter #1 (Appendix B). The letter outlined the purpose of the study, the procedures, and the time commitment involved. Parents were required to sign consent form #1 (Appendix C) in which they were assured that participation in the study was strictly voluntary and withdrawal from the study would not affect their ability to obtain services. The investigator telephoned parents approximately one week after letters were mailed to answer any questions about the study. A total of 11 letters were mailed and 9 parents agreed to participate. All nine parents who completed questionnaires and interviews were mothers.

Normally developing children who matched the autistic children were chosen from parents who responded to requests for volunteers from day cares and church groups. Letter #2 (Appendix B) was sent to parents who agreed to have their names forwarded to the investigator. These parents

signed consent form #2 (Appendix C). A total of 12 children and their parents were seen. Three children were excluded from the study because they scored more than one standard deviation from the mean of the normative group on the VABS. All nine participating parents of the final sample of normally developing children were mothers.

Procedures

An appointment was made with each participating parent for the investigator to visit the child's home. Parents were requested to limit, as much as possible, distractions in the environment including loud noises (e.g., television, washing machines, dishwashers, or music) and the presence of other people. Parents of autistic children were also asked whether they would agree to have the play observations videotaped. All agreed and subsequently signed consent form #4 (Appendix C). Parents of normally developing children agreed to videotaping when they consented to participation in the study.

During the first appointment, children were videotaped during free-play in a room chosen by the parent. Two time periods of videotaping were conducted, each lasting approximately 15 minutes. During the first 15 minutes, parents were instructed to respond to their child when approached but not to encourage interaction. They were also instructed to intervene in their child's play only to prevent injury to person or property. In order to decrease the possibility of parental involvement in the child's play, parents filled out the demographic and play questionnaire (Appendix D) during this time. Children were requested to show the investigator how they play if they were not already playing.

Immediately after the first observation period, the investigator asked the child and parent to sit together while the investigator showed the toys that she had brought with her. The toys were representative of the types of objects that have been shown by previous research to elicit different levels of cognitive play and that would allow scoring of the dimensions of the PPS. The toys were a small vehicle, a doll with clothes, colored blocks, a 4 piece puzzle, a 10 piece puzzle, a ball, a kaleidoscope, and a plastic container. The investigator presented toys in the same order for all children using an established protocol. Parents were instructed that they had the option of playing with their child during this 15 minute observation period.

Thus, two different conditions were created. In the first condition, the play situation was very unstructured for the child. In the second condition, structure was increased by making specific toys and the child's parent available to the child. The first condition was a natural situation for the child. However, the second condition was also included to provide some consistency in availability of play materials and to provide availability of a play partner so that the social elements of play could be observed.

Although efforts were made to follow a set protocol for each child, conducting the study in a natural environment meant that there were many uncontrolled variables. Therefore, it was sometimes necessary to modify the protocol slightly to respond to the needs of the environment. One example was the presence of a younger sibling at the time of the videotaping. Efforts had to be made to limit the sibling's involvement in the subject's play. This situation occurred during the videotaping of two autistic children and one normally developing child.

Due to the possibility of subject reactivity to the videotaping, every effort was made by the investigator to be as unobtrusive as possible. She responded in a friendly manner to any overtures made by the parent or the child but did not encourage interaction. Most children were curious about the investigator and the videotaping to a greater or lesser extent but usually made less verbal and gestural references to the investigator or the camera as they became more involved in their own play. This was especially true when parents became involved in their child's play. However, one autistic child became quite disturbed by the videocamera in spite of his mother's attempts to distract and reassure him. Therefore, videotaping was terminated and on line scoring of the PPS and categories of play materials was done.

Final PPS scores were calculated from the child's best performance rated during the two 15 minute observation periods. This resulted in a total of 30 minutes of observation[1]. Final lists of play materials included those used during both sessions.

Observation procedures were pilot tested with four preschool children. Interrater reliability was established between the investigator and a second experienced pediatric occupational therapist using videotapes of children in

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[1]Due to situational and technical difficulties one autistic child and one normally developing child were scored on the basis of 29 minutes rather than 30 minutes of observation time.

the pilot test. Training continued until reliabilities for the PPS reached point by point agreements of 89 per cent and intraclass correlation coefficients of .77. This resulted in agreement on eight out of nine of the PPS categories and disagreement of only one age level on the ninth category. Agreement on the numbers of categories of play materials reached 100%. During the study, these videotapes were reviewed and scored by the investigator after nine observations as a reliability criterion to assist in preventing observer drift.

The investigator was blind to the mental ages of the autistic children and, as much as possible, to the chronological ages of the normally developing children. Consequently, she was unaware of the matches between most of the children until the completion of the study.

After the PPS observations were completed, the investigator interviewed parents using the Vineland Adaptive Behavior Scales (VABS). Interviews generally took place on a different day than the PPS observations in order to allow the investigator to score the videotapes prior to the interviews. However, VABS interviews were conducted prior to scoring the PPS for four autistic children and three normally developing children because, either the parent lived out of town or the parent made a special request to have the interviews done immediately after the videotaping. All interviews took place in parents' homes. Five of the autistic children had VABS scores from assessments that had been completed by a clinical psychologist within the previous four months (M = three months; range = two to four months). These scores were used instead of requiring the child's parent to do the interview again. For these parents, the letter of introduction #3 (Appendix B) and consent form #3 (Appendix C) were used.

Measures

Preschool Play Scale

The PPS was designed to evaluate play within a developmental framework. It consists of four dimensions; space management, material management, imitation, and participation. Childhood play behaviors in each one year time span from birth to six years of age are clustered into categories and described within these dimensions. The child is observed in a free play situation (usually a clinic, day care, or nursery school) and rated on the scale according to the highest age level attained in each category. The mean of the

category scores provides a dimension score. The total score is calculated by taking the mean of the dimension scores (Bledsoe & Shepherd, 1982).

Reliability and validity studies have been done with samples of normally developing (Bledsoe & Shepherd, 1982) and handicapped (Harrison & Kielhofner, 1986) children. Interrater reliability was determined for both groups. Bledsoe and Shepherd (1982) reported correlations between two raters from .976 and .993 for the dimension scores and .996 for the total score. Harrison and Kielhofner (1986) reported that intraclass correlation coefficients for three raters were between .55 and .91 for the dimension scores and .88 for the total score. Test-retest correlations have been .861 to .965 (Bledsoe & Shepherd, 1982) for dimension and play scores within a one week period and .73 to .91 (Harrison & Kielhofner, 1986) for a time span of between 4 and 14 days.

Correlations between dimension and total scores and the child's age have ranged from .887 to .955 for normally developing children (Bledsoe & Shepherd, 1982) and .48 and .91 for handicapped children (Harrison & Kielhofner, 1986). In the latter study, the dimension involving motor activity accounted for the poorest correlation with age. This is to be expected because the sample included physically handicapped children.

Concurrent validity has also been measured. Correlations between Parten Scale scores (Parten, 1932) and PSS total scores and participation scores have ranged from .60 to .64 (Bledsoe & Shepherd, 1982; Harrison & Kielhofner, 1986).

Four adaptations were made to the PPS for the purposes of this study. The categories of "music" and "books" were eliminated from the imitation dimension and the categories of "territory" and "exploration" were eliminated from the space management dimension. This was done because of the limited number of observations that have been made in these categories in previous studies (Bledsoe & Shepherd, 1982; Harrison & Kielhofner, 1986). Bundy (1989) also omitted these categories when using the PPS to compare the play of children with sensory integrative dysfunction with that of normally developing children. In addition, the "type" category of the participation dimension was eliminated and the items in the "language" category that specify communication to "peers" were changed by substituting "adults". These changes were made because the child's play with peers was not observed in this study. Finally, the categories of the imitation dimension were

combined into one category. This was done because many of the items in different categories were similar and therefore created dependencies in the scoring of the separate categories.

The PPS was chosen for this study for two reasons. First, it had demonstrated fairly good reliability and validity in other settings and with other populations. Second, it evaluates a range of play behaviors that include motor, cognitive, and social abilities along a developmental continuum. This continuum is consistent with the exploration and competency stages of the model of human occupation (Kielhofner, 1985) described previously. For example, the "purpose" category of the "material management" dimension contains descriptions of play behaviors that progress from sensory exploration (exploration) to interest in the process of performing skills and to interest in the outcome of actions (competency). Thus, it is consistent with a theoretical frame of reference that can be used to guide treatment. In addition, the approach of looking at play from different dimensions of ability has potential for identifying areas of relative strength or weakness in an individual child's play behavior. Therefore, information about the scale's ability to evaluate the play of autistic children in their homes will help to determine whether it is feasible for use with this population in this setting.

Choices of Play Materials

The total number of categories of play materials used by a child during the observation period was used as a measure of variety in the child's interest in play materials. To be classified as an object used in play, the child must have actively manipulated the object during times when he or she freely chose the activity and the actions on the objects appeared to be more important than the final product. The categories were adapted from Johnson & Ershler (1985) and were as follows:

1. Dramatic Play Materials - included small vehicles, house play materials, dolls, dress up clothes, toys representing farms, stores, fire halls, villages, etc.

2. Construction Materials - included blocks, Lego, puzzles, play dough, etc.

3. Gross Motor and Sensorimotor Materials - included climbing apparatus, tricycles, scooters, balls, tops, rattles, kaleidoscopes, etc.

4. Other toys - included all objects that are commonly considered to be a child's toy or game but could not be classified elsewhere.

5. Non Toy Objects - included all objects not commonly intended for use as a child's toy e.g., household objects, rocks, etc.

Vineland Adaptive Behavior Scales

The VABS is a standardized, norm referenced evaluation of adaptive behavior of individuals from birth to 18 years, 11 months of age. The survey form consists of the four behavior domains of communication, daily living skills, socialization and motor skills. A total of 261 items are scored within these domains according to the following criteria: the behavior is usually performed, the behavior is sometimes or partially performed, the behavior is never performed, there is no opportunity for the respondent to observe the behavior, or the respondent has no knowledge of the child's performance of the particular behavior. Age equivalent scores can be calculated for the adaptive behavior composite and each of the 4 domains.

Several reliability and validity studies have been completed and are described in the administration manual (Sparrow et al., 1984). Test-retest reliability coefficients for children under the age of seven years were calculated for the domain scores on a sample of 224 caregiver interviews by the same interviewer in a two to four week interval. The coefficients ranged from .77 to .98. Interrater reliability coefficients for raw scores of the four domains obtained from a sample of caregivers of 160 children and adolescents ranged from .96 to .99 for two administrations of the interview by two different interviewers within a time period of 1 to 14 days .

Validity studies have revealed low to moderate correlations between VABS scores and scores obtained from the Kaufman Assessment Battery for Children and the Peabody Picture Vocabulary Test suggesting that the scales measure different areas of functioning. The scales are based on a developmental framework and evidence for its validity as a measure of development is provided by increasing raw score means with increasing age.

This parent report measure was chosen to measure children's adaptive abilities for three reasons. First, it has good psychometric properties. Second, it is a useful tool for assessing the adaptive abilities of autistic children (Watson & Marcus, 1988; Volkmar et al., 1987). Finally, it measures children's usual performance in the areas of communication, socialization

and motor skills. These skills, in addition to cognition, are thought to contribute strongly to play behavior.

Correlations between the communication, socialization and motor skills domains of the VABS and the PPS total scores in this study allowed examination of the relationship between parents' reports of children's behavior in each of these domains and the observed play performance of the children. The self care skills domain was not expected to be directly related to play behavior and therefore was not included in the analysis.

The investigator trained in the use of the VABS by reviewing the VABS training tape and interviewing three mothers of preschool children. An audiotaped interview was reviewed with two separate experienced raters. Point by point agreement reached 86%.

Mental Age

Mental ages of autistic children were determined from results of a developmental test administered to each child within a six month period (M = 2.8 months prior to the observations; range = six months prior to the play observations to one month after the observations) by a clinical psychologist as part of other clinical and research evaluations. Due to the wide range of language and cognitive abilities in this group of children, a single cognitive test was not appropriate for all children. Although the use of different tests with different children is a methodological problem in conducting research, it is an unavoidable occurrence in clinical settings (Lord & Schopler, 1989). The tests used to evaluate individual children were the Merrill-Palmer Scale of Mental Tests (Stutsman, 1931) (n = 4), the Bayley Scales of Infant Development (Bayley, 1969) (n = 1), the Wechsler Preschool and Primary Scale of Intelligence (Wechsler, 1967) (n = 2), the Coloured Progressive Matrices (Raven, 1965) (n = 1), and the Leiter International Performance Scale (Arthur, 1952) (n = 1).

The mental ages of normally developing children were assumed based on their chronological age. In order to ensure that the normally developing children were neither precocious or delayed for their chronological age, two steps were taken during the recruitment of subjects. First, parents were asked if they had any concerns about their child's development. Only those children for whom there were no concerns were included in the study. Second, normally developing children who scored more than one standard deviation

higher or lower than the appropriate standard score mean on the VABS were excluded from the study.

Matching mental ages of autistic children to chronological ages of normally developing children was done within a six month time period. Therefore, the chronological age of each normally developing child was from two months over to four months under the mental age of their match. This resulted in the mean chronological age of the normally developing children being 1.11 months under the mean mental age of the autistic children.

Parental Socioeconomic Status

Parental socioeconomic status (SES) was determined from parental reports of occupation based on Blishen, Carroll, & Moore's (1987) socioeconomic index for Canadian occupations. The index uses income level, educational level, and, to a minimal extent, occupational prestige to calculate scores for occupations as listed in the Canadian Classification and Dictionary of Occupations.

Scores were dichotomized into two levels (higher and lower) using the median scores for males and females. If both of the child's parents were employed, the score of the parent with the highest SES level was used. Seven matched pairs were in the higher SES level and two matched pairs were in the lower SES level.

Demographic and Play Questionnaire

Observations of play in natural environments does not allow for control over the various aspects of the environment that might influence individual children's play behavior. As the literature review suggests, play partners and play objects may influence play. In addition, the child's experiences in other environments such as day cares may allow children to learn different play behaviors that are later used in the home. Therefore, information about the child's home setting and play activities was collected from the demographic and play questionnaire (Appendix D). The information included age and sex of siblings, individuals living in the home, the child's experiences in child care, educational, and recreational activities outside of the home, the child's favorite toys, and the child's favorite play activities. Due to the small sample size in this study, this information was used descriptively.

CHAPTER V
RESULTS

Data were analyzed using the SPSSx statistical package on a mainframe computer system. The alpha level was set at .05. In order to compensate for the increased chance of Type I errors when doing multiple *t* tests, a procedure suggested by Ryan (1959) was followed. The alpha level of .05 was divided by the number of *t* tests performed (five) resulting in a new alpha level of .01. Therefore, the results of *t* tests performed in this study were considered significant only if $p < .01$. Results of other statistical tests were considered significant if $p < .05$. All tests of significance were two-tailed unless otherwise specified.

Sample Characteristics

Table 1 shows the mean mental age, chronological age, and maternal education of the sample. The mean mental age of the autistic group was similar to the mean chronological age of the normally developing group as was the mean number of years of maternal education. There were eight boys and one girl in each group.

Both groups were relatively similar in their family configuration. All children were living with both parents at the time of the study except for one autistic boy who was living with his mother. However, this child's father also took part in his care. Of the autistic group, two children had no siblings, five had one or more older siblings, and two had a younger sibling. Of the normally developing sample, three children had one or more older siblings, four had a younger sibling, and two had both a younger and an older sibling. Consequently, equal numbers in both groups had at least one older sibling.

Reliabilities

Interrater reliabilities for the PPS total and dimension scores were determined using randomly selected videotapes of two autistic and two normally developing children. Agreement between two independent raters was calculated using a repeated measures analysis of variance and a formula for the intraclass correlation coefficient (ICC) designed to take into account systematic variations between the raters as part of the total variability

Table 1

Mean Mental Age, Chronological Age, and Maternal Education of Autistic and Normally Developing (ND) Groups

Group	Mental Age (months)	Chronological Age (months)	Maternal Education (years)
Autistic (n = 9)	51.89 (SD=12.24)	64.67 (SD=6.40)	14.56 (SD=3.71)
ND (n = 9)		50.78 (SD=11.28)	14.44 (SD=2.46)

(Fleiss, 1975)[2] . This reliability statistic was chosen because it is appropriate to use in situations in which agreement is being measured between raters using scales of interval level data (Fleiss, 1975). Fleiss and Cohen (1973) have demonstrated that this formula is equivalent to the weighted kappa statistic used for agreement between raters using scales of ordinal data. The ICCs for the PPS total and dimension scores were as follows:

Total	.96
Participation	.84
Imitation	1.00
Space Management	.50
Material Management	.94

All ICCs were within acceptable ranges except for the space management dimension. On this dimension, the raters scored three out of four children identically and differed by only one age level for the fourth child.

Interrater reliability for the number of categories of play materials used was also evaluated using videotapes of the same four children. Two sets of reliabilities were calculated, one for the total observation time and one for the unstructured play period. An ICC could not be calculated for the number of play materials used during the total observation time due to the lack of variance in the scores made by one of the raters. Point by point agreement was .75. The ICC for the unstructured play period was .75.

Group Comparisons of Play Performance

To determine how the play performance of autistic children differed from that of normally developing children, the groups were compared on the PPS total scores, PPS dimension scores, and the number of categories of play materials used during the observation time.

Comparison of the PPS total scores between the autistic and normally developing groups was done using a one-tailed *t* test. The autistic group had significantly lower PPS total scores ($\underline{M}$ = 33.57 months; $\underline{SD}$ = 6.55) than the

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[2] S - E / S + E + 2O (p. 657) where S equals the sums of squares between subjects, O equals the sums of squares between observers and E is the error term.

normally developing group (M = 42.53 months; SD = 6.11), t (16) = -3.00, p = .004.

In order to determine whether the groups differed on any of the four PPS dimension scores that comprise the total score, a Hotelling's T was calculated using a multivariate analysis of variance procedure. This analysis yielded an exact F (4, 13) of 3.30, p = .045. Subsequent Roy-Bargman stepdown F tests were calculated to determine the contribution of each of the dimensions to the overall variance while controlling for dependency between scores. The participation dimension was entered into the equation first because this dimension was expected to demonstrate the greatest difference between groups. The imitation and space management dimensions were also expected to contribute significantly to the differences. The material management dimension was entered last because no difference between groups was anticipated. As shown in Table 2, participation was the only dimension that contributed significantly to the differences between groups.

Significant correlations between the four dimension scores could account for the lack of significant contributions to differences between groups by the dimensions that were entered into the equation after the participation dimension. Consequently, Pearson correlations were used to determine whether there were significant associations between the four dimension scores. The autistic and normally developing groups were considered separately. As can be seen by the correlation matrices in Table 3, the dimension scores were not significantly correlated for either group.

Univariate F tests for each of the dimension scores are summarized in Table 4. Confidence intervals were also calculated on the differences between group means. The width of the confidence interval assists in interpretation of non significant results because the width of the confidence interval is directly related to the variability in the estimate of the effect. The narrower the confidence interval the less the variability and the more likely that there is no difference between the populations from which the samples were taken (Hennekens & Buring, 1987). In addition, the use of confidence intervals provides information on specific variables when no differences between groups are expected.

As can be seen from the table, the difference on the participation dimension score was significant. The differences between the mean scores of the imitation and space management dimensions were not significant. The

Table 2

PPS Dimension Scores - Stepdown *F* Tests

	F	*df*	*p*
Part	13.16	1,16	.002
IM	1.02	1,15	.327
SM	.09	1,14	.769
MM	.38	1,13	.549

Note. Part = participation; IM = imitation; SM = space management; MM = material management

Table 3

Correlation Matrix of PPS Dimension Scores

Autistic Group

	Part	IM	SM	MM
Part	1.000			
IM	.186	1.000		
	(p=.631)			
SM	-.048	.000	1.000	
	(p=.904)	(p=1.000)		
MM	.031	.455	.355	1.000
	(p=.937)	(p=.218)	(p=.349)	

Normally Developing Group

	Part	IM	SM	MM
Part	1.000			
IM	.140	1.000		
	(p=.719)			
SM	-.129	-.102	1.000	
	(p=.742)	(p=.794)		
MM	.207	.333	-.156	1.000
	(p=.594)	(p=.381)	(p=.690)	

Note. Part = participation; IM = imitation; SM = space management; MM = material management

Table 4

Univariate F tests of Group Differences in

PPS Dimension Scores

	Autistic		ND				95%	
					F	p	confidence	
	M	SD	M	SD	(1, 16)		intervals	
PART	27.33	6.08	44.00	12.37	13.16	.002	-13.20;	-3.46
IM	24.00	15.88	36.00	10.39	3.60	.076	-12.70;	.70
SM	44.00	10.39	44.00	16.97	.00	1.000	-7.03;	7.03
MM	38.93	8.47	46.13	7.28	3.74	.071	-7.54;	.34

Note. Part = participation; IM = imitation; SM = space management; MM = material management

95% confidence interval for the difference in mean scores on the material management included the null value of no difference between groups.

A comparison between the number of categories of play materials used by each group was calculated using a t test. The mean total number of categories was identical for the two groups (M = 4.00).

Associations between Play Performance and Adaptive Abilities

As mentioned previously, the autistic group had significantly lower PPS total scores than the normally developing group even when matched for mental age/chronological age. The autistic group also had significantly lower VABS total scores (M = 29.14 months; SD = 8.36) than the normally developing group (M = 54.47 months; SD = 11.45), t (16) = -5.36; p = .000. In order to determine the associations between these variables a Pearson correlation matrix was calculated. The results are shown in Table 5. For both the autistic and normally developing group VABS total scores were significantly correlated with PPS total scores. In contrast, the mental age/chronological age variable was not significantly correlated with PPS total scores for either group. It is also interesting to note that the VABS total scores were poorly correlated with the mental ages of the autistic group. The VABS total scores were significantly correlated with the chronological ages of the normally developing group. However, this latter correlation was influenced by the sample exclusion criterion that eliminated normally developing children who did not score within one standard deviation of their age norm on the VABS.

In order to determine which aspects of adaptive abilities were associated with play performance, PPS total scores were correlated with the communication, socialization, and motor skills domain scores of the VABS using Pearson correlation matrices. As can be seen in Table 6, the autistic group and the normally developing group had different patterns of correlations. For the autistic group, communication was the only domain score that correlated significantly with the PPS total score. For the normally developing group, socialization was the only domain score that correlated significantly with the PPS total score.

Table 5

Correlation Matrix of Mental Age (MA) / Chronological Age (CA), PPS Scores and VABS Scores

Autistic Group

	MA	PPS	VABS
MA	1.000		
PPS	.546 (p=.129)	1.000	
VABS	.196 (p=.614)	.698 (p=.037)	1.000

Normally Developing Group

	CA	PPS	VABS
CA	1.000		
PPS	.615 (p=.078)	1.000	
VABS	.983 (p=.000)	.685 (p=.042)	1.000

Table 6

Correlation Matrix of PPS Total Scores and VABS Domain Scores

Autistic Group

	PPS Total	Comm.	Soc.	M.S.
PPS Total	1.000			
Comm.	.755	1.000		
	(p=.019)			
Soc.	.412	.830	1.000	
	(p=.270)	(p=.006)		
M.S.	.422	.227	.043	1.000
	(p=.258)	(p=.557)	(p=.912)	

Normally Developing Group

	PPS Total	Comm.	Soc.	M.S.
PPS Total	1.000			
Comm.	.638	1.000		
	(p=.064)			
Soc.	.729	.658	1.000	
	(p=.026)	(p=.054)		
M.S.	.575	.739	.820	1.000
	(p=.105)	(p=.023)	(p=.007)	

Note. Comm. = communication; Soc. = socialization; M.S. = motor skills

CHAPTER VI
DISCUSSION
Differences in Play Behavior

Play Performance

The results support the hypothesis that autistic children have delays in play performance, as measured by the PPS, when compared to normally developing children. The groups were matched on a cognitive measure so these differences cannot be accounted for by cognitive factors alone.

The PPS total score is calculated as the average of the four dimension scores. The low and nonsignificant correlations between these scores suggest that they measure uniquely different aspects of play behavior. Thus, examination of the differences between groups on each of these dimensions provides insight into the contributions of specific elements of play to the autistic children's lower total scores.

Participation is the only dimension in which differences between groups are significant. This dimension includes items that measure both social interaction and communication behavior. Delays and deviancies in these two areas of development are primary diagnostic criteria for autism (American Psychiatric Association, 1987). This study reinforces the concept that differences between autistic and normally developing children in this dimension of play are the result of the features of autism. Similarities between the groups on the variables of gender, socioeconomic status, and maternal education eliminate these factors as alternative explanations for such differences.

One factor that was not controlled but may be argued to be an alternative explanation for the differences in social behavior found in this study is related to whether the child has siblings. Two autistic children did not have siblings whereas all normally developing children had siblings. Although there is controversy regarding the positive influence of siblings on social development, being an only child does not appear to affect children's sociability as perceived by others (Falbo & Polit, 1986). It is unlikely that the presence of two children without siblings in the autistic groups could explain the difference between groups on the participation dimension.

Opportunities to observe, imitate and interact with other children may be important in facilitating social development. All autistic children in this sample had such opportunities. Mothers of autistic children reported that their

children spent considerably more time (M = 21.39 hours; SD = 7.67) than the normally developing children (M = 7.67 hours; SD = 4.47) in child care, educational, and recreational groups outside of the home. However, exposure to these social opportunities may not be sufficient for autistic children to learn social behaviors. These behaviors may be better learned under conditions in which communicative and cognitive demands are minimized and social partners are active and intrusive (Lord, 1984).

The autistic group did not differ significantly from the normally developing group on the imitation dimension. Previous research has suggested that autistic children have deficits in imaginative (Baron-Cohen, 1987; Wing et al., 1977) and imitative (Riquet, Taylor, Benaroya, & Klein, 1981) abilities. Unexpectedly, the results of this study suggest that preschool autistic children achieve comparable levels of imaginative and imitative play as their mental age matched peers in natural environments. One explanation is that differences in imaginative play may be related to autistic children spending less time in complex levels of play (Sigman & Ungerer, 1984), which was not measured in this study, rather than to not reaching comparable levels. It is also possible that the ability of autistic children to imitate may improve with increased structure (Gould, 1986) and modelling (Riquet et al., 1981). Only two of the nine autistic children demonstrated any imitative or imaginative play during the unstructured play period whereas seven demonstrated such play during the more structured condition. The structure and modelling that was provided in the second condition may have been sufficient to allow the autistic children to reach levels of imaginative and imitative play comparable to the normally developing children. It is also important to note that, as shown in Table 7, two autistic children did not demonstrate any imitative or imaginative play during the entire observation time. In contrast, all of the normally developing children achieved a score of at least 24 months on the imitation dimension of the PPS. It appears that some individual autistic children may lack imitative and imaginative play, whereas others do not.

Another possible explanation for the lack of a significant difference on the imitation dimension is related to the relationship between imitation, imagination and social play. The imitation dimension of the PPS is acknowledged to be related to social learning (Knox, 1974). It is possible that once the social aspects of play are accounted for through the participation

Table 7

Frequency Distribution of PPS Imitation Scores

PPS Imitation Score (months)	Number of Autistic Children	Number of Normally Developing Children
0	2	0
12	1	0
24	1	2
36	5	6
48	0	0
60	0	1
72	0	0

dimension, imitation and imagination do not add appreciably to any differences between groups.

The lack of difference between groups on the space management dimension was also unexpected. This dimension is essentially a measure of gross motor skills and the autistic group was expected to score lower than the normally developing group because of the association between neurodevelopmental impairment and autism (Rutter, 1985). One possible explanation for the lack of difference between groups is that matching on the basis of mental age resulted in a group of autistic children with similar cognitive abilities but higher chronological ages than the group of normally developing children. Similar scores of the two groups on the space management dimension suggest that the autistic children's motor development may be delayed in relation to their chronological age but comparable to their cognitive abilities. Previous research (Jones & Prior, 1985) has indicated that this is not the case and that autistic children demonstrate poorer motor skills than normally developing children even when they have been matched on a cognitive measure.

Another possible explanation for the nonsignificant findings between groups on the space management dimension is that the observational methods used in administering the PPS made it difficult to detect a broad range of motor skills. This difficulty was most pronounced when using the PPS with children in the older age groups. For example, if a six year old child sat for the entire observation time playing with a video game, the opportunity for observing his or her motor abilities was limited. The child had to be scored using the PPS items which meant that the highest observed behavior was an ability to sit with balance. This resulted in an age equivalent score of 12 months even though it was obvious that the child was capable of much more complex gross motor movement.

Due to the difficulties in scoring the space management dimension of the PPS, it was decided to determine whether the lack of difference between groups on this dimension was consistent with another measure of motor development. A t test was used to compare the groups on the motor skills domain of the VABS. The results indicated that the autistic children had significantly lower motor skills scores (M = 38.89 months; SD = 8.67) than the

normally developing children (M = 54.78 months; SD = 12.70), t = -3.10; p = .007[3]. It is possible that the discrepancy between the two measures occurred because the motor skills domain of the VABS measures both gross motor and fine motor skills whereas the space management dimension of the PPS measures only gross motor skills. Autistic children may have poorer fine motor skills but similar gross motor skills when compared to normally developing children. It is also possible that autistic children have significantly poorer gross motor skills than normally developing children of similar mental age but the PPS was unable to detect such differences.

The lack of difference between groups on the PPS also may be due to low statistical power. The low interrater reliability of this dimension may have increased the error term and contributed to a loss of power (Cohen, 1977). In addition, the small sample size limited the ability of the tests of significance to detect differences between groups. Therefore, it is possible that the nonsignificant result for the space management dimension could be due a Type II error that resulted from difficulties in scoring the dimension and the small sample size.

The similarity between autistic and normally developing children on the material management dimension of the PPS suggests that autistic children manipulate play materials in developmentally similar ways to normally developing peers who have been matched on a cognitive measure. Although Tilton & Ottinger (1964) found differences between autistic and normally developing children's use of toys, they matched children on the basis of chronological age. The present study, by matching children on a cognitive measure, suggests that cognition may be a confounding variable when studying differences between autistic and normally developing children's manipulation of toys. Once cognition is controlled, autistic children may be similar to normally developing children on this dimension.

In summary, preschool autistic children's play, when viewed from a developmental framework, is less mature than the play of normally developing children. The social and communicative aspects of play behavior appear to make the greatest contribution to this difference.

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[3] Two of the normally developing children and none of the autistic children reached ceiling scores on the motor skills domain of the VABS. This means that the difference between groups has likely been underestimated.

Imitative/imaginative and object manipulation aspects of play demonstrate less variation between autistic and normally developing groups when social and communicative aspects of play are accounted for and factors such as cognition, gender and socioeconomic status are controlled. Differences between groups on the motor aspects of play cannot be inferred from this study.

Interest in Play Materials

Although restriction in activities and interests is a diagnostic criterion for autism (American Psychiatric Association, 1987), the data indicate that autistic children demonstrate at least as much interest in manipulating as many categories of toys as normally developing children. This finding was unexpected. One possible explanation is that parents encouraged children to use a variety of materials during the structured play period. Therefore, the mean number of play materials used during the unstructured play period was compared. The autistic children actually played with more categories (M = 2.56; SD = 1.13) than the normally developing children (M = 1.78; SD = 1.09) although the difference was not statistically significant, t (16) = 1.48; p = .157.

Another explanation is that the observation period was too short to provide adequate representation of the child's interests in play materials. In order to determine whether there was any descriptive evidence for differences in interests in play materials on a more general basis, mothers' responses to the question on the demographic and play questionnaire related to their children's favorite play materials were reviewed. Mothers of both autistic and normally developing children were able to name toys that their children liked to play with and included toys that fell into at least two of the five categories of play materials. Examples of toys enjoyed by autistic children included puzzles, cars, trains, blocks, and small figures. These toys were similar to those mentioned by mothers of the normally developing children in this study. Therefore, a longer observation period may not have revealed any different results in relation to interests in play materials.

Alternatively, it is possible that interest in play materials as measured by the number of play materials used during a specific observation period simply may not differ between autistic and normally developing preschool children who have been matched on a cognitive measure. Instead, children's interest in the toys themselves may be less important in discriminating autism

than children's actions with the toys. Other researchers have noted the repetitive nature of autistic children's actions with objects (Romanczyk, Diament, Goren, Trunell, & Harris, 1975). It is possible that a restricted repertoire of actions with toys, which was not investigated in this study, may discriminate autistic children from normally developing children more than an interest in the objects themselves.

It is also possible that differences in the number of categories of play materials used during a specified observation period may be related to factors such as attention span as well as to interest in the objects. Children with shorter attention spans may play with a greater number of play materials because they play with each toy for a shorter duration.

In summary, the results of this study provide evidence that preschool autistic children's interest in manipulating types of toys is similar to their mental age matched peers. The clinical observations that these children have restricted play interests may be more related to differences in their actions with toys or duration of play with toys. The relationship between autism, actions on toys, attention span, and the play materials used during an specified time period requires further investigation.

Play and Adaptive Abilities

The results indicate that autistic children's adaptive abilities are significantly and positively correlated to play performance. Mental age, on the other hand, is not significantly related to play performance. These results lend support to Sigman and Ungerer's (1984) position that there are qualitative variations in children's play not accounted for by cognition alone. These variations may be strongly associated with adaptive behavior.

Investigation of the relationship between domain scores of the VABS and PPS total scores revealed that communication was the only domain score that was significantly correlated to play for the autistic group. Prior research has supported the relationship between higher levels of language abilities and symbolic play in samples of autistic children (McHale et al., 1980; Mundy et al., 1987). However, because symbolic play is only one part of the concept of play as measured by the PPS, this finding expands on previous research by suggesting that higher levels of communication behavior are associated with higher levels of play development in general. In their review of the literature, Fein, Pennington, & Waterhouse (1987) reported that

communication and play may be dependent on a common neurological system, namely the limbic system.

The results of the correlations for the normally developing group must be interpreted with caution. This group of children are not necessarily representative of the population of normally developing children and the results cannot be generalized to that population. In spite of this caution it is interesting to consider how the patterns of correlations of the normally developing children compare with the autistic children. Similar to the autistic children, adaptive behavior was more highly correlated with play performance than was chronological (mental) age. In contrast to the autistic children, the normally developing children's socialization scores were highly and positively related to play whereas communication scores were only moderately and not significantly correlated to play.

The direction of the relationship between social and communication behavior on one hand and play performance on the other hand can not be determined from this study. It is entirely possible that the relationship is not unidirectional but rather circular; social and communication behavior influence play and play influences social and communication behavior.

Implications

The results of this study build on a growing body of literature that points to deficits in the area of social development as being a central feature of autism (Denckla, 1986; Fein, Pennington, Markowitz, Braverman, & Waterhouse, 1986). Previous studies have supported this idea using standardized interviews of children's parents (Volkmar et al., 1987). This study adds additional support using naturalistic observations of children's play in their homes. The implication of using such observations is that the home provides an environment in which autistic children's potential for social interaction is maximized. Lord (1984) has shown that familiarity, minimal cognitive and communicative demands, and an active play partner can maximize autistic children's social interaction. The naturalistic observations used in this study provided children with a familiar environment, few demands, and the opportunity for their parents to become actively involved in their play. Even in this environment social participation emerged as the aspect of play, as measured by the PPS, on which autistic children differed most from their normally developing peers.

The results also add to our knowledge of the nature of the social deficits in autism. The children in this study were matched for mental age and therefore the differences between groups are unlikely to have resulted from deficits as evaluated by standardized cognitive measures. However, it is possible that a specific type of social cognition is necessary for specific types of social, communication and play behaviors. Leslie (1987) has argued that theory of mind, i.e., ability to understand that others may have beliefs and desires that are different from one's own, can explain autistic children's deficits in social skills, communication, and imaginative play. The results of this study provide evidence that, during play, autistic children's social and communicative abilities are more delayed than their imaginative abilities in relation to their normally developing peers. If autistic children do have a theory of mind deficit (Baron-Cohen,1988; Baron-Cohen et al., 1985), the impact of that deficit during the preschool years appears to be more evident in social and communicative behaviors than in imaginative play. The ability to understand other's points of view may be necessary for a person to participate in reciprocal social interaction. It is interesting to note that the autistic children in this study did not achieve the more mature items on the participation dimension of the PPS that were related to reciprocity, e.g., self-initiated turn taking, social give and take, and rivalry. The relationships between this aspect of social behavior, theory of mind, and autism will require further investigation.

The results of this study also add to our knowledge of play development. Using the model of human occupation (Kielhofner, 1985) behavior can be conceptualized as progressing through the developmental stages of function consisting of exploration, competency, and achievement. An individual's behavior can include features of any of the three stages. The results of this study support the concept of behavior emanating from more than one stage. Many autistic children in this study appeared to be at the exploration stage of social participation in which they were developing basic skills. These same children also appeared to be at the competency stages of the material management aspect of play in which they were able to meet the expectation of their environment in a manner that was similar to their normally developing peers. The lack of significant correlations between scores on the four dimensions of the PPS provides additional evidence that children can be

at different levels of functional development in the different dimensions of play.

The other contribution of this study to understanding play behavior is found in the relationship of children's play to their habits. Play is intrinsically motivated (Rubin et al., 1983). As such it can be considered a behavioral reflection of what Kielhofner and Burke (1985) have termed the child's volitional subsystem. The volitional subsystem is viewed as determining and being affected by two other subsystems. The first is the performance subsystem which consists of basic perceptual motor, processing, and communication/interaction skills. The second is the habituation subsystem which organizes skills into habits and roles and is reflected by the child's usual behavior within his or her family and community environments. The results of this study allow us to examine the relationship between the volitional subsystem, as reflected in children's play, and the habituation subsystem, as reflected in their adaptive behavior. The high and positive correlations between the PPS scores and the VABS scores support this model by providing evidence that the volitional and habituation subsystems are strongly related. The results also suggest that the volitional subsystem may be more closely related to habituation than to other developmental measures such as mental age or chronological age. The direction of the relationship between volition and habituation is less clear than the existence of the relationship. Although Kielhofner and Burke (1985) have proposed a hierarchical relationship with volition being the overriding subsystem, the fluid nature of the human behavioral system means that constraints are placed on volition by the habituation and performance subsystems. According to this theory, children's play partially determines which skills are practiced and which habits are formed while levels of skill and habit place constraints on play.

On a practical level, the results of this study support the use of play observations in the differential diagnosis of autism. Some authors (Doherty & Rosenfeld, 1984) have suggested that focussing on the imaginative aspects of play may contribute to diagnosis. The results of this study indicate that, for preschool children, focussing on the social and communicative elements of play may provide more valuable diagnostic information. However, even for preschool children, delays in the social and communicative elements of play development alone cannot be used as diagnostic criteria for autism. Other

groups of children may demonstrate such delays. For example, Bundy (1989) found differences between boys with sensory integrative dysfunction and normally developing boys on the participation and other dimensions of the PPS. Play observations, with particular attention to the social and communicative elements of play, will facilitate the differential diagnosis of preschool autistic children only when used in combination with other information.

In addition to the use of play as a diagnostic criterion, the findings related to the positive associations between adaptive abilities, particularly those in the area of communication, and children's play performance suggest that play may be a very worthwhile medium for facilitating the development of these behaviors. If play is accepted as a means by which children build skills and practice roles (Kielhofner, 1980), then the therapeutic use of play with autistic children may have an important function in developing the skills necessary for interpersonal interaction and for experimenting with roles that necessitate communicating with others.

Play, however, is dependent on volition. A child's desire to engage in certain activities may be affected not only by their interests but also by their skills and competency in the activity. Kielhofner and Burke (1985) have argued that choices for participating in activities are dependent, in part, on personal causation. Personal causation is a person's belief in their ability to affect their environment. This belief is shaped by the feedback that is received about one's performance in activities. Autistic children may frequently receive feedback that their social participation does not meet the expectations of their environment or the standards of their peers. This may lead to a decreased desire to participate in play activities that require social participation. The result is a negative cycle in which the children do not avail themselves of opportunities to practice the skills that they need.

The challenge for the therapist is to facilitate play in a way that is attractive and utilizes the learning styles of the child. The results of this study indicate that many preschool autistic children can be interested in a variety of play materials and will spontaneously use the materials. Previous research has shown that autistic children's play behavior can be modified through techniques such as modelling and reinforcement (Tryon & Keane, 1986) and imitation (Tiegerman & Primavera, 1981). Modifying play behavior through the use of these techniques and supplying attractive play materials may be a

starting point for facilitating autistic children's engagement with their play environment and increasing their desire to explore and master interpersonal habits and skills. If play represents an element of children's productivity (Reed & Sanderson, 1983) and is valuable in and of itself, then promoting competency in play is important in its own right. The resulting cycle is now positive; therapists facilitate play, children practice skills and habits through play, children then use these skills and habits to increase competency in play.

The results of this study also provide information about the use of the PPS to plan and evaluate treatment programs for autistic children. Although the PPS had been used previously with groups of children who have had a variety of handicapping conditions such as mental retardation (Knox, 1974), physical disabilities (Harrison & Kielhofner, 1986) and sensory integrative dysfunction (Bundy, 1989) there are no published reports of its use with autistic children. In addition, the PPS has usually been used in child care settings and only infrequently in the child's home (Harrison & Kielhofner, 1986).

The results of this study demonstrate the ability of the PPS to identify areas of strength and weakness in autistic children. This information assists in establishing treatment goals. The instrument's ability to reflect a developmental progression of play performance also enhances its usefulness for focussing on goals that are developmentally appropriate. Finally, its ability to be used in the child's home increases the validity of assessment findings. During this study, one mother of an autistic child commented to the investigator that her child had demonstrated much more play behavior during the observation time of the present study than he had during a previous study in which he had been asked to play in an unfamiliar environment. In addition, autistic children's spontaneous play has been shown to be quite different than their achievement on structured play evaluations (Gould, 1986). The intent of any play intervention should be to improve the child's ability to play in a natural environment.

Although the PPS demonstrates several positive features for use with autistic children, the difficulties in using this instrument should also be acknowledged. Caution must be used when interpreting the results for individual children due to the lack of standardized procedures and norm referenced scores. In addition, this study reveals difficulties in scoring the space management dimension in children's homes as described previously.

This problem could be addressed by revising the items in the space management dimension to more accurately define a developmental progression of motor behavior that can be observed in natural environments. The PPS also does not evaluate the duration of play in various levels of maturity. This information is important when assessing the play of autistic children because some of the qualitative deficits of their play may be related to maintaining rather than achieving mature levels. This issue was discussed earlier in relation to the cognitive maturity of play but may also be important in relation to the manipulation of play materials. For example, even though autistic children achieve fairly high levels of manipulation, how much time is spent in manipulating the materials in a goal directed manner versus manipulating the materials in a self-stimulatory or repetitive manner? Finally, it is important for clinicians to recognize the limitations of using the imitation dimension of the PPS with children who have communication disorders. One of the difficulties in scoring imaginative acts in children is the interpretation of the observer as to what is an imaginative act. Often this is accomplished by depending on the child's verbalizations. For example, if a child holds a shell to his or her ear how does the observer know if the child is seeking a sensory experience or is pretending the shell is a telephone? Such interpretations are made easier if the child verbalizes, "I hear the ocean" or alternatively, "Hello, Grandma". If an autistic child is unable to communicate such differences to the observer because of language deficits, the observer may have considerably more difficulty interpreting the behavior. It is possible that limitations in communicative behavior may not only limit the autistic child's participation in role playing activities but also limit the observer's ability to interpret the imaginative act.

The scoring of the PPS must always be done in consideration of the environment in which play occurs. Information about settings, play materials, and the behavior of the other people involved in the play assists in determining whether the play environment for the child is optimal. A systematic way of gathering such information would improve the clinical utility of the instrument for assessing an autistic child's play.

The usefulness of the PPS to evaluate the effectiveness of treatment programs is unclear. Although the potential exists for its use for this purpose, it is unknown whether the instrument is sensitive enough to the changes in play behavior that can be expected from play intervention programs for this

population of children. This can only be determined through future investigation.

Limitations

Statistical Power

One of the limitations of this study was the low number of available subjects. Epidemiological studies conducted in Canada (Bryson, Clark, & Smith,1988) and elsewhere (Gillberg, 1990) have estimated the prevalence of autism to be 6.6 to 13.6 per 10,000 children. The low prevalence of this disorder limits the number of subjects available at any given time. In addition, the subjects in this study were referred from a clinical caseload. The referring clinician had extensive experience in the field of autism and saw virtually all of the children who had been diagnosed with autism in Edmonton and the surrounding area. However, many children with autism are not seen clinically until long after their third birthdays (Gillberg, 1990). The group of preschool children referred for the study may have had more severe autistic symptoms, facilitating early clinical referral and diagnosis, than the population of autistic children as a whole. Another factor that also contributed to the low number of subjects was the exclusion criterion that eliminated children who had mental ages of less than 18 months. As a result, younger mentally retarded autistic children were excluded from the study because their mental ages were below the criterion. This criterion did not exclude older children to the same extent.

Although small sample sizes are frequent in studies of low prevalence disorders such as autism, the implication is that the chances of Type II errors on tests of statistical significance are increased. Therefore, differences between the groups on the various dimensions of the PPS may not have reached significance because the sample size was too small to detect such differences. The observed power of each of the univariate F tests at an alpha level of .05 for the PPS dimensions was as follows:

Participation	.92
Imitation	.43
Space Management	.00
Material Management	.44

The power for the space management dimension was zero because group means were equal. The low power of both the imitation and material management dimensions illustrate the need for replication of this study with a larger sample.

The power of the *t* test to detect a difference between the groups on the number of categories of play materials used during the unstructured play period at an alpha of .01 was also very low. Using Cohen's (1977) method for calculating power, the effect size was found to be moderate (.70) but due to the low alpha level and the small sample size the power was only .11. Therefore, it is possible that, in an analysis with greater statistical power, a difference between groups may be detected. It is also possible, as suggested by the trend that emerged in this study, that the direction of this difference may be toward autistic children playing with more categories of play materials than normally developing children.

Measurement of Mental Age

Another limitation of the study was the assumption that the mental ages of the autistic children corresponded with the chronological age of the normally developing children. Care was taken to ensure that the mean chronological age of normally developing children was lower than the mean mental age of autistic children. In addition, efforts were made to recruit normally developing participants who were neither delayed or precocious for their chronological age as described earlier. In spite of these precautions, the possibility exists that the two groups did not have comparable levels of cognitive ability. In future studies, the use of the same cognitive measure with all children, although difficult, would assist to determine whether the results could be replicated with children who were known to have similar levels of achievement on a cognitive test.

Blind Rating

The investigator was not blind to the diagnosis of the children or to the study hypotheses when rating the children on the PPS and VABS. This may have introduced biases into scoring. However, the investigator was blind to the mental ages of the autistic children and matching was done by another person to reduce the effect that such biases may have had on the study results.

Subject Selection

The selection of autistic children with a mental age of at least 18 months not only reduced the number of available subjects but also may have reduced the frequency of mental retardation in the study group. Epidemiological studies have reported that mental retardation occurs in 75 to 90% of people with autism (Gillberg, 1990). Less than 50% of the autistic children in this study had nonverbal IQ scores below the normal ranges.

This same selection criterion may have also increased the frequency of children in families with a higher socioeconomic status than would be anticipated in the general population of autistic children. Although there is substantial evidence that autism occurs equally in all social classes (Gillberg, 1990), 78% of the autistic children in the study sample came from families that scored above the median on the socioeconomic index for Canadian occupations. This bias may be associated with the mental age bias because children's IQs may be associated with parental IQs which, in turn, may be associated with parental socioeconomic status.

Therefore, subject selection procedures biased the sample toward higher cognitive ability and higher socioeconomic status than can be anticipated from epidemiological studies of autism. It has been documented that IQ is a strong predictor of good prognosis in autism (Szatmari, Bartolucci, Bremner, Bond, & Rich, 1989). Therefore, the implication of this bias is that the sample of children in this study is biased toward abilities that are associated with better long term outcomes than the population of autistic children as a whole.

CHAPTER V11
CONCLUSIONS

The results of this study contribute to our understanding of preschool autistic children's play. They also raise several more research questions.

This study supports the theory that the social deficits associated with autism are primary features of the disorder. However, the social skills deficits that may be specific to autism are not addressed. Children with other disorders may have lower PPS participation scores than their peers (Bundy, 1989). The specific social participation skills evident during children's play that discriminate autistic children from others and the patterns of play development that contribute to the differential diagnosis of children in this age group have yet to be identified. A potential area of continued research is to look more closely at specific skills that may be associated with the ability to attribute mental states to others such as role playing and the reciprocity required in turn taking and making compromises.

Another area for future investigation is the comparison of autistic children's play performance in different environments. The home environment was chosen for this study because of its social relevance for preschool children. Many children are also enrolled in programs outside of the home in which play could be observed. It can be expected that preschool settings provide higher levels of social stimulus than the home environments observed in this study. How does the play performance of autistic children differ from the home environment to the preschool setting?

A third area of potential investigation is to examine the relationships between play performance in this age group and long term outcomes. This study demonstrated the concurrent relationships between adaptive abilities and play performance. Future investigation could examine the relationships between preschool play performance and future adaptive abilities. Do preschool autistic children with higher PPS scores have more positive social outcomes when they are school-aged, adolescents, and adults? Such investigations would help to determine how important play itself may be in determining future social competency. As Lord (1984) has suggested, an ability to play may be an important factor in facilitating autistic children's interactions with peers.

Play provides a medium through which preschool children develop skills, experiment with roles, and interact with others. Differences between

the play of autistic and normally developing children suggest that autistic children are disadvantaged in their use of play for these purposes. The current trend of providing early intervention in order to improve the long term outcomes of autistic children emphasizes the importance of preschool children's play in future research and treatment intervention.

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Appendix A

Preschool Play Scale

Preschool Play Scale

Space Management

The child's use of his/her body through gross motor activity.

Gross Motor Activity

Months	Behaviors
0	- not observed
12	- reaches (extends hand toward an object but does not have to have contact with it) - plays with hands and feet - touches hands to feet - crawls - sits with balance (sits for > 30 seconds unsupported) - pulls to stand - moves to continue pleasant sensations (moves to obtain a sensory experience).
24	- stands unsupported - sits down with purposeful movement (i.e. does not drop) - bends and recovers balance (bends from the waist while sitting or standing and returns to the sitting or standing position or significantly readjusts sitting posture) - walks, runs - uses a wide stance (feet are shoulder width or further apart) - climbs low objects (e.g. climbs on to a step) - broad movements involving large muscle groups (uses a wide base, i.e. feet are shoulder width apart) - rides kiddie car
36	- integration of body in activity throws, jumps, reciprocal arm movements when walking and running, climbs onto objects (objects must be higher than a step and lower than the child)
48	- more coordinated movement walks, jumps, climbs, runs with narrower stance (i.e. feet less than shoulder width apart); accelerates, decelerates
60	- stunts (e.g. standing on 1 foot for more than 5 seconds, hopping on two feet, etc.) - tests of strength - exaggerated movements (purposeful and controlled gross motor movements that are more exaggerated than that usually required for the performance of the activity; often associated with a dramatic component)
72	- hops on one foot - summersaults - skips

Material Management

The child's control and use of material surroundings (i.e. toys and other materials used for play).

Manipulation

0 - not observed

12 - handles toys
- mouths toys
- brings 2 objects together (there does not have to be a functional relationship)
- picks up objects (removes objects from a surface with hands)
- hits (uses open hand with force to contact an object)
- bangs (picks up object and bangs on a surface)
- shakes

24 - throws
- inserts large objects (e.g. forms, blocks, puzzle pieces etc.).
- pushes
- pulls
- carries
- pounds (uses closed hand to pound on the object)

36 - feels (uses fingers to touch the contour of the object)
- pats (uses palmar aspect of hand or finger to lightly tap the surface of an object)
- dumps (removes objects from a container by turning the container over; also includes qualitatively similar activities such as removing rings from a stacking base by turning the base over)
- squeezes (places object in his/her hand and squeezes so that the shape of the object changes; can also include moving a part of a toy held in the hand such as squeezes the trigger of a toy gun)
- fills (puts objects in a container until the container is unable to hold any more objects)

48 - hammers (uses tool to bang on object)
- sorts (arranges objects into some type of recognizable order such as according to size, color, shape, letters, etc.)
- inserts small objects (objects must be less than 1 inch by 1 inch by 1 inch; e.g. pegs and the receptacle must not be mot than twice as big as the object)
- cuts (uses scissors to cut paper but does not follow a lie or pattern)

60 - fine motor control allows use of quick movements, force, and pulling in fine motor manipulation tasks. In order for the child to score on this category the child must have manipulated an object not larger than 2 inches by 1 inch and must use a pincer grip when manipulating the object).

72 - uses tools to make things (e.g. uses scissors to cut a shape, uses glue to create an object, etc.)
- copies a form that is more complex than a square or triangle
- traces a form than is more complex than a square or triangle
- uses a variety of material (e.g. uses paints, paste, glue, etc. in the same task).

Construction

12 - not observed

24 - slight attempt to make a product
- relates 2 objects appropriately (e.g. puts lid on pot, clothing on doll, figure of a man in a car, bottle in doll's mouth)
- stacks objects (such as blocks) one on top of the other
- takes apart 2 objects that are related to each other including objects that are stacked, and pieces of a puzzle
- puts 2 objects together (e.g. large Leggo pieces, parts of a toy to make a specific object such as putting together the parts of a Fisher Price Village)

36 - scribbles
- strings beads
- 4-5 piece puzzles (must complete the puzzle independently although verbal guidance is allowed)

48 - makes simple products (out of blocks, with crayons, clay, or play dough) by creating a two dimensional form (i.e. must be more complex than stacking or lining up blocks, or random scribbles)
- combines play materials (e.g. uses blocks with sticks) to make a product
- takes apart simple products and combinations of play materials as specified above
- arranges things spatially so that a specific design is evident but is not recognizable as representing an object. Child must be using objects that are classified as construction materials such as blocks, Leggo, crayons and play dough.

60 - makes products that consist of a specific design or that consist of complex (three dimensional) structures (when a specific product is not intended by the toy itself)
- 10 piece puzzles (must complete the puzzle independently although verbal guidance is allowed)

72 - makes recognizable products (i.e. the product represents an object and is readily identifiable as that object)
- attends to details (e.g. draws facial features)
- uses things that he/she makes in play (e.g. creates an object from Leggo then uses the object when playing with dolls)

Interest

0 - not observed

12 - people (gazes at faces, attends to voices, watches movement)
- attends to sounds

24 - explores kinesthetic and proprioceptive sensations (child repeats simple movement patterns without a recognizable goal; e.g. rocking)
- watches and plays with moving objects (e.g. balls, trucks, pull toys)

36 - explores new movement patterns (e.g. jumping, assuming unusual postures)
- plays with toys with moving parts (e.g. dump truck, jointed dolls, kaleidoscope, computer games) by intentionally moving the parts
- makes messes (includes messy play with paints, clay, play dough, etc.)

48 - uses fine motor manipulation of play materials - in order for this item to be scored the child must be playing with an object not larger than 2 inches by 1 inch and must use a pincer grip when manipulating the object; also includes drawing.

60 - takes pride in work (e.g. spontaneously and without prompting shows and talks about things he/she has made, likes pictures displayed)
- attends to or develops complex ideas (e.g. listens to another persons ideas that include several component parts e.g. "lets get all the blocks , build , a tower, then knock all the blocks down with a ball" - the child must be looking at the person who is speaking and must not be engaged in any other activity. Can also include reenactment of ideas of several component parts that have been developed from the child's previous experiences such as movies, TV shows or stories.

72 - manipulation of real life situations (e.g. uses miniature objects to enact stories)
- makes objects that have some use (e.g. props for play)
- likes products that have some permanence
- likes toys that "really work" (e.g. a camera that actually takes pictures)

Purpose

0 - not observed

12 - uses materials for sensation (e.g. uses materials to see, touch, hear, smell and taste)

24 - experiments in movement (practices basic movement patterns such as rocking, walking, running and assuming unusual postures - the process is important)

36 - slight interest in product but the process continues to be important (e.g. scribbles, squeezes play dough, stacks blocks)
- repetition of gross motor skills

48 - moderate interest in product - child demonstrates moderate interest by having a specific goal and persisting with actions to achieve that goal; the product is slightly more important than the process (e.g. the child specifically chooses certain parts or materials during the construction of the product

60 - product very important - child wants the product to have some permanence (e.g. the child demonstrates verbally or nonverbally that he/she does not want the product destroyed)
- uses objects to express self (e.g. drawings)
- exaggerates - uses objects as part of exaggeration including fabrication of a story

72 - uses objects to replicate reality

Attention

0 - not observed

12 - follows moving objects with eyes

24 - rapid shifts in attention (attention to one object or theme is less than 5 minutes). The child must actively manipulate an object to score on this item. "Theme" includes the same type of toy. Therefore, if the child does one puzzle then immediately begins to construct a different puzzle he/she is considered to be in the same attention time period. However, if he/she picks up a blocks prior to starting the second puzzle, the attention period is terminated as soon as the child picks up the block.

36 - quiet play (plays by self or with only minimal prompting from another person) for 10 to 15 minutes regardless of how many objects or themes are used)
- plays with a single object or theme 5-9 minutes

60 - plays with a single object or theme 10-15 minutes

Participation

The child's interaction with people in the environment.

Cooperation

0 - not observed

12 - demands personal attention (using a limited number of single behaviors such as crying, standing near the person, repeatedly calling the person's name)
- simple give & take interaction with family (e.g. tickling, peek-a-boo)

24 - games (hide and seek, chasing, games of catch that are structured and maintained by others)
- offers toys but possessive (with very minimal or no prompting, gives toy to another person to play with and there is at least one other episode in which the child demonstrates possessiveness)
- persistent (in seeking interaction with others using a combinations of behaviors that are socially complex such as standing near the person and talking, smiling and talking, getting the person's attention and showing the person something, etc.)

36 - very possessive - snatch and grab, hoarding, no sharing, resists toys being taken away (this category can be scored if the child gives something to another person only because the child wants help with requires a considerable amount of prompting to give up the toy)something related to the toy or if the child
- independent - does not ask for help, initiates own play without adult intervention (the child must actively manipulate play materials for at least 5 minutes in order for this item to be scored).

48 - some turn taking (i.e. takes turns at using a toy and watches when another person takes their turn) when prompted to do so by others. Can also include a reciprocal action with the same toy (e.g. alternating putting blocks on the same tower).
- asks for things rather than grabbing them
- slight attempt to control others (i.e. occasionally tells others what to do, verbally or nonverbally, in the context of the play situation)

60 - takes turns (i.e. takes turns at using a toy and watches when another person takes their turn) on own initiative

- attempts to control the activities of others (e.g. frequently self-centered & bossy; frequently tells others what to do in the context of the play situation)

72 - social give and take evident (e.g. makes compromises)
- rivalry in competitive games. There must be a well structured game and the competitiveness must be defined before the game begins.

Language

0 - not observed

12 - attends to sounds & voices (turns head toward a sound or voice)
- babbles (i.e. utters meaningless sounds)

24 - jabbers (utters meaningless sounds to self during play using inflection that sounds like conversation or a song)
- uses gestures and words to communicate wants
- labels objects

36 - talkative during play using real words rather than jabber
- uses words to communicate ideas and information (must be more complex than merely naming an object or event)

48 - interest in new words (i.e. repeats the word and asks its meaning)

60 - very talkative - plays with words (i.e. rhymes, puns, etc.)
- fabricates; long narratives (e.g. verbally expresses stories that he/she has made up; especially describing events in the first person)
- questions persistently (asks at least 10 questions (seeking information and not related to the child's performance of an activity) during the 15 minute observation period)
- communicates with adults to organize activities (e.g. tells adult where or how to place an object, what role the adult or the child will play, who will begin a turn taking game, etc.)

72 - language prominent in sociodramatic play (uses words as part of the play situation such as when playing a role, as well as to organize play)
- relevant how and what for questions

Imitation

The child's imitation and representation of the social world.

Imitation/Imagination/Dramatization

0 - not observed

12 - imitates facial expressions (e.g. smiling)
- imitates physical movement (e.g. pat-a-cake)
- imitates emotions (e.g. hugs or kisses toys)

24 - imitates simple actions with objects (watches someone perform an action on an object then repeats the same action immediately)
- imitates present or past events and people using self-related mimicry (e.g. feeds self with spoon)
- imaginary, or substitute objects (e.g. pretend food on spoon)

36 - imitates adult routines with toy related mimicry (e.g. feeds doll with spoon, puts doll to bed). The child must be personifying the doll, or using imaginary or substitute objects in order to score on this item. If, for example, the child puts a bottle in the doll's mouth he/she must also hold the doll in a manner that baby's are often held or must make verbal reference to the doll being hungry, sad, etc. Or, the child may use a substitute object for a bottle as long as it is clear that what the object is representing. If the child does not make such references then actions such as putting the bottle in the doll's mouth is scored as "relating 2 objects appropriately" under the construction category. This item can also include routines such as driving a car but "driving" must be portrayed rather than simple movement of the car.
- toys as agents (e.g. doll feeds self)
- portrays single character
- personifies dolls, stuffed animals
- starts having imaginary friends

48 - imitates simple action and reaction episodes (mirrors experiences- emphasis is on domestic and animal themes such as eating, sleeping). The episode must contain both an action and a reaction. For example, if the child feeds a doll with a bottle, a reaction from the doll must also be portrayed.
- portrays multiple (more than one) characters with feeling (especially anger and crying)
- slight interest in costumes (may wear a special hat to portray a character)
- assumes familiar roles (e.g. domestic themes, past experiences). The dramatization must include at least 2 separate actions that portray the same role within the same play sequence. For example, the child feeds the doll then puts the doll to bed.

60 - role playing for or with others (the child takes on an identifiable role in a play sequence for or with someone else)
- portrays more complex emotions (such as fear, envy, etc.)
- sequences stories- themes include domestic to magic but must have a beginning middle and end to the story.
- enjoys dress-ups (wears an entire outfit for role playing)
- uses familiar knowledge to construct a novel situation (e.g. expand the theme of a story or TV show)

72 - sequences stories - emphasis on copying real world (the story must have a beginning, middle and end and must be a reflection of real world events that is not a domestic theme or copying a television show)
- costumes, props, puppets are important - these must be used as part of a specific story
- constructs new themes with emphasis on real world rather than stories or TV

Adapted from Bledsoe & Shepherd (1982) and Knox (1974)

Appendix B

Letters to Parents

Letter to Parents #1

Dear Parent,

Thank you for agreeing to allow Dr. Lord to forward your name to me. I am a graduate student at the University of Alberta who will be conducting a study on the play of preschool children with and without difficulties in communication and social behavior. The purpose of the study is to help us to understand more about how communication and social behavior affect children's play. In addition, the study may assist us to determine whether an observational method of evaluating children's play in their own homes will be useful as a tool to plan and evaluate treatment programs.

If you agree to participate, your child will be observed for 30 minutes in your home at a convenient time for you. In addition, you will be asked to fill out a short questionnaire about your home and your child's play. Finally, you will be interviewed regarding your child's communication, self care, social and movement abilities. The interview is expected to last 45 to 60 minutes and can be completed at a time and place of your choice.

Please read the enclosed consent form. If you agree to participate in the study please sign the form and return one copy of it in the enclosed self-addressed envelope. A summary of the results of the study will be made available to all participants who would like one. I will be calling you in the next week to answer any questions you may have about the study or you may call me at 492-0402.

Yours truly,

_____

Gayle Restall

Letter to Parents #2

Dear Parent

Thank you for agreeing to allow Joyce Magill-Evans to forward your name to me. I am a graduate student at the University of Alberta who will be conducting a study on the play of preschool children with and without difficulties in communication and social behavior. The purpose of the study is to help us to understand more about how communication and social behavior affect children's play. In addition, the study may assist us to determine whether an observational method of evaluating children's play in their own homes will be useful as a tool to plan and evaluate treatment programs.

If you agree to participate, your child will be videotaped for 30 minutes in your home at a convenient time for you. In addition, you will be asked to fill out a short questionnaire about your home and your child's play. Finally, you will be interviewed regarding your child's communication, self care, social and movement abilities. The interview is expected to last 60 to 75 minutes and can be completed at a time and place of your choice.

Please read the enclosed consent form. If you agree to participate in the study please sign the form and return one copy of it in the enclosed self-addressed envelope. A summary of the results of the study will be made available to all participants who would like one. I will be calling you in the next week to answer any questions you may have about the study or you may call me at 452-0753.

Yours truly,

_____

Gayle Restall

Letter to Parents #3

Dear Parent,

Thank you for agreeing to allow Dr. Lord to forward your name to me. I am a graduate student at the University of Alberta who will be conducting a study on the play of preschool children with and without difficulties in communication and social behavior. The purpose of the study is to help us to understand more about how communication and social behavior affect children's play. In addition, the study may assist us to determine whether an observational method of evaluating children's play in their own homes will be useful as a tool to plan and evaluate treatment programs.

If you agree to participate your child will be observed for 30 minutes in your home at a convenient time for you. In addition, you will be asked to fill out a short questionnaire about your home and your child's play.

Please read the enclosed consent form. If you agree to participate in the study please sign the form and return one copy of it in the enclosed self-addressed envelope. A summary of the results of the study will be made available to all participants who would like one. I will be calling you in the next week to answer any questions you may have about the study or you may call me at 492-0402.

Yours truly,

_____

Gayle Restall

Appendix C

Consent Forms

Consent Form #1

Title: Preschool Children's Play at Home

Investigator:

Gayle Restall
Graduate Student
Phone: 492-0402 / 454-0753

Advisor:

Dr. J. Magill-Evans
Assistant Professor
Phone: 492-0402

I, _____ parent/guardian of _____ agree that my child and I will participate in the study of the play of children with and without social and communication difficulties. I understand that my child will be observed for 30 minutes in his/her home by the researcher. I also understand that I will be requested to fill out a short questionnaire about my child's home and play. I will also be interviewed about my child's communication, self-care, social and motor abilities. The interview will last approximately one hour. In addition, I grant permission to the researcher to obtain information about my child's intellectual, communication, self care, social, and motor abilities from Dr. Lord.

I understand that my participation and my child's participation in this study is completely voluntary. I may refuse to answer any questions and may withdraw from the study at any time without jeopardizing my ability to receive services of any kind for my child.

I understand that my name and my child's name will not appear on any completed forms, but will be identified by a code number instead. My name and my child's name will not be associated with any publications that result from this study. The information obtained will remain confidential.

I understand that the results of this study may help to find better ways to assist children who have difficulties playing. However, they will not necessarily benefit me or my child as individuals at this time.

All questions regarding this study have been answered to my satisfaction. I may call either of the people listed above if I have any concerns at a later time. I have kept a copy of this form for my own information.

_____	_____
Signature of parent/guardian	Date
_____	_____
Witness	Date
_____	_____
Investigator	Advisor

Consent Form #2

Title: Preschool Children's Play at Home

Investigator:
Gayle Restall
Graduate Student
Phone: 492-0402 / 454-0753

Advisor:
Dr. J. Magill-Evans
Assistant Professor
Phone: 492-0402

I, _____ parent/guardian of _____, agree that my child and I will participate in the study of the play of children with and without social and communication difficulties. I understand that my child will be videotaped for 30 minutes in his/her home by the researcher. I also understand that I will be requested to fill out a short questionnaire about my child's home and play. I will also be interviewed about my child's communication, self-care, social and motor abilities. The interview will last approximately 60 to 75 minutes.

I understand that my participation and my child's participation in this study is completely voluntary. I may refuse to answer any questions and may withdraw from the study at any time without jeopardizing my ability to receive services of any kind for my child.

I understand that my name and my child's name will not appear on any completed forms or the videotape. These will be identified by a code number instead. I also understand that the videotape will be viewed only by people directly involved in the study and will be erased or returned to me after the study is completed. My name and my child's name will not be associated with any publications that result from this study. The information obtained will remain confidential.

I understand that the results of this study may help to find better ways to assist children who have difficulties playing. However, they will not necessarily benefit me or my child as individuals at this time.

All questions regarding this study have been answered to my satisfaction. I may call either of the people listed above if I have any concerns at a later time. I have kept a copy of this form for my own information.

_____	_____
Signature of parent/guardian	Date
_____	_____
Witness	Date
_____	_____
Investigator	Advisor

Consent Form #3

Title: Preschool Children's Play at Home

Investigator:

Gayle Restall
Graduate Student
Phone: 492-0402 / 454-0753

Advisor:

Dr. J. Magill-Evans
Assistant Professor
Phone: 492-0402

I, _____ parent/guardian of _____, agree that my child and I will participate in the study of the play of children with and without social and communication difficulties. I understand that my child will be observed for 30 minutes in his/her home by the researcher. I also understand that I will be requested to fill out a short questionnaire about my child's home and play. I grant permission to the researcher to obtain information about my child's intellectual, communication, self care, social, and motor abilities from Dr. Lord.

I understand that my participation and my child's participation in this study is completely voluntary. I may refuse to answer any questions and may withdraw from the study at any time without jeopardizing my ability to receive services of any kind for my child.

I understand that my name and my child's name will not appear on any completed forms, but will be identified by a code number instead. My name and my child's name will not be associated with any publications that result from this study. The information obtained will remain confidential.

I understand that the results of this study may help to find better ways to assist children who have difficulties playing. However, they will not necessarily benefit me or my child as individuals at this time.

All questions regarding this study have been answered to my satisfaction. I may call either of the people listed above if I have any concerns at a later time. I have kept a copy of this form for my own information.

_____	_____
Signature of parent/guardian	Date
_____	_____
Witness	Date
_____	_____
Investigator	Advisor

Consent Form #4

Consent to Videotape

Title: Preschool Children's Play at Home

Investigator:

Gayle Restall
Graduate Student
Phone: 492-0402 / 454-0753

Advisor

Dr. J. Magill-Evans
Assistant Professor
Phone: 492-0402

I,_____, parent/guardian of _____ grant permission for the observations of my child's play to be videotaped as part of the study of the play of children with and without social and communication difficulties. I understand that the videotaping will be done for thirty minutes in my home by the researcher. I also understand that the videotape will be viewed only by people directly involved in the study and will be erased or returned to me after the study is completed. My name and my child's name will not appear on the videotape. Videotapes will be identified by a code number instead.

I understand that my consent for videotaping is strictly voluntary and will not jeopardize my ability to receive services of any kind for my child. All questions regarding the videotaping have been answered to my satisfaction. I may call either of the people listed above if I have any concerns at a later time.

_____ _____
Signature of parent/guardian Date

_____ _____
Investigator Advisor

Appendix D

Demographic and Play Questionnaire

Demographic and Play Questionnaire

Please fill in the information requested below. It will help us to understand more about your child's home and how he or she plays.

Mother - occupation - please indicate job title and type of work done

_____

total years of education _____

Father - occupation - please indicate job title and type of work done

_____

total years of education _____

Siblings	Male/Female	Age
	_____	_____
	_____	_____
	_____	_____

Please list all the people that are living in your home.

Please indicate the number of hours per week that your child attends any of the following:

Child Care

Nursery school

Kindergarten

Special Treatment Program

School - grade

Extra curricular activities e.g.. church, clubs, lessons, special programs

The following questions are intended to find out how your child plays. All children play in different ways so there are no right or wrong answers.

1. What are your child's favorite things to play with? Please describe them.

_____

_____

_____

_____

_____

2. What does your child do with the objects mentioned above?

Does your child ever bang, wave, suck, roll or spin objects?

Does he or she ever build things, line up objects, or organize objects in some way?

Does he or she ever pretend?

3. Are there any toys or play materials that your child really dislikes?

What are they? How do you know he/she dislikes them?

Child's date of birth. - _____

Appendix E

Summary Letter to Parents

Dear Parent,

Thank you for participating in our study of children's play. Now that the study has been completed I would like to share with you some of our findings.

During the study, nine children with social and communication difficulties and nine children without such difficulties were observed playing in their homes. The results of the study demonstrated that the play of the children with social and communication difficulties differed from the play of children without such difficulties. As expected, these difficulties were most evident in social participation. Other aspects of play such as imagination, manipulation of play materials, and the number of types of play materials used did not differ significantly between the two groups of children. There was a strong relationship between children's communication or social skills and their general play development.

The results of the study emphasized the importance of observing play for determining children's strengths and developmental difficulties. The results also suggested that play can be used to facilitate communication and social skills. Observing children in the familiarity of their own homes was a valuable way of obtaining information about their play development. All of the children who I visited actively played during the time that I was observing them.

It was a great pleasure to spend time with you and your child. I thank you sincerely for your contribution to this project.

Yours truly,

Gayle Restall